

GEANT-3.21 Simulation of the Balbekov Square Cooling Ring

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meeting.*

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Initial beam conditions

- 1) $E_{tot} = 250 \text{ MeV}$
- 2) $\sigma_{E_{tot}} = 18 \text{ MeV}$
- 3) $\sigma_{P_x} = \sigma_{P_y} = 32 \text{ MeV}$
- 4) $\sigma_x = \sigma_y = 4 \text{ cm}$
- 5) $\sigma_z = 8 \text{ cm}$

*energy-momentum correlation according
V.B. MUC-NOTE-COOL THEORY-246*

and few parameters

- 6) $f_{RF} = 205.900$
 - 7) $G = 15 \text{ MV/m}$
- synchronous phase for accel. = 30°*

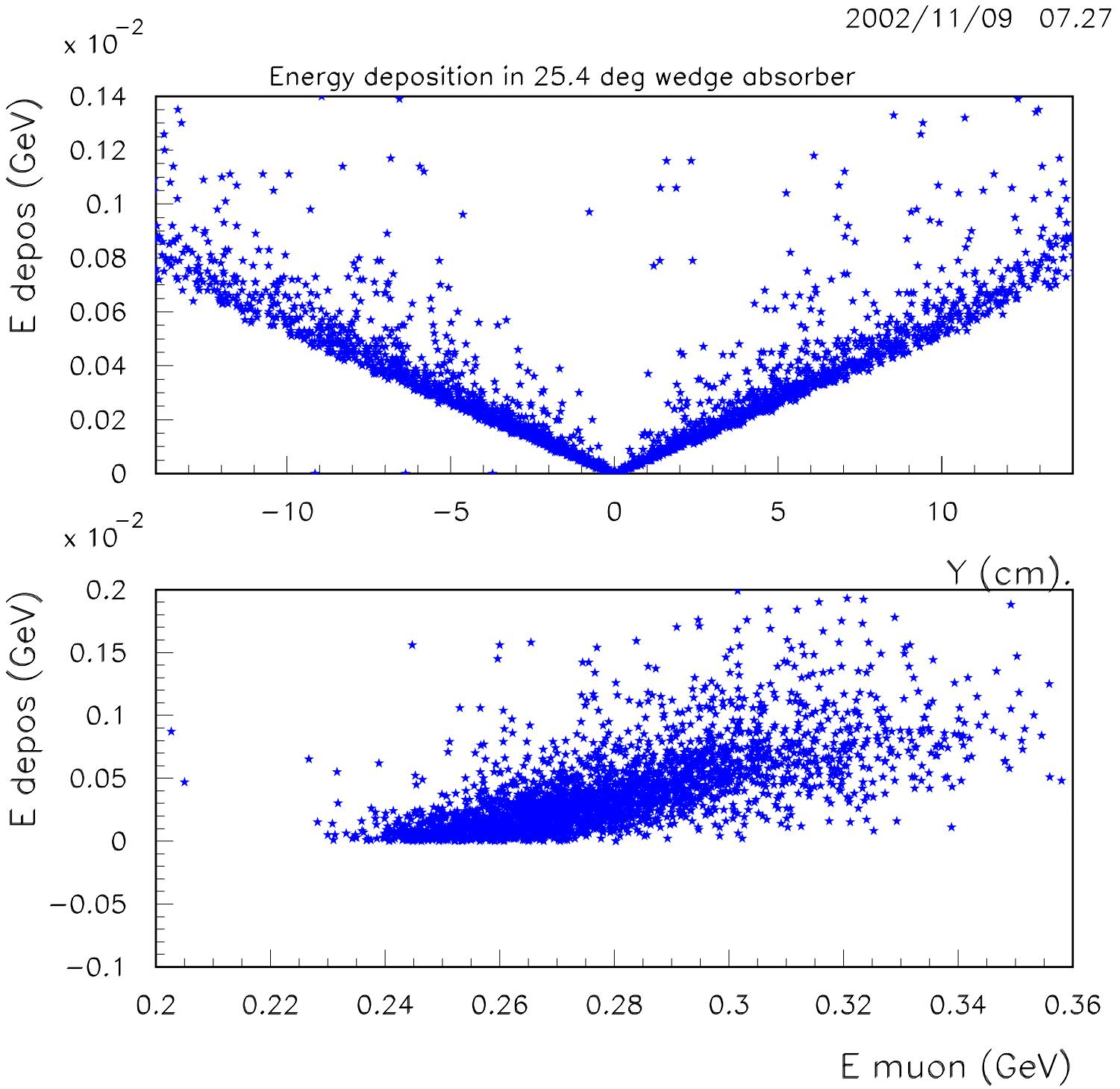


Figure 1: Energy deposition at LH_2 wedge absorber.

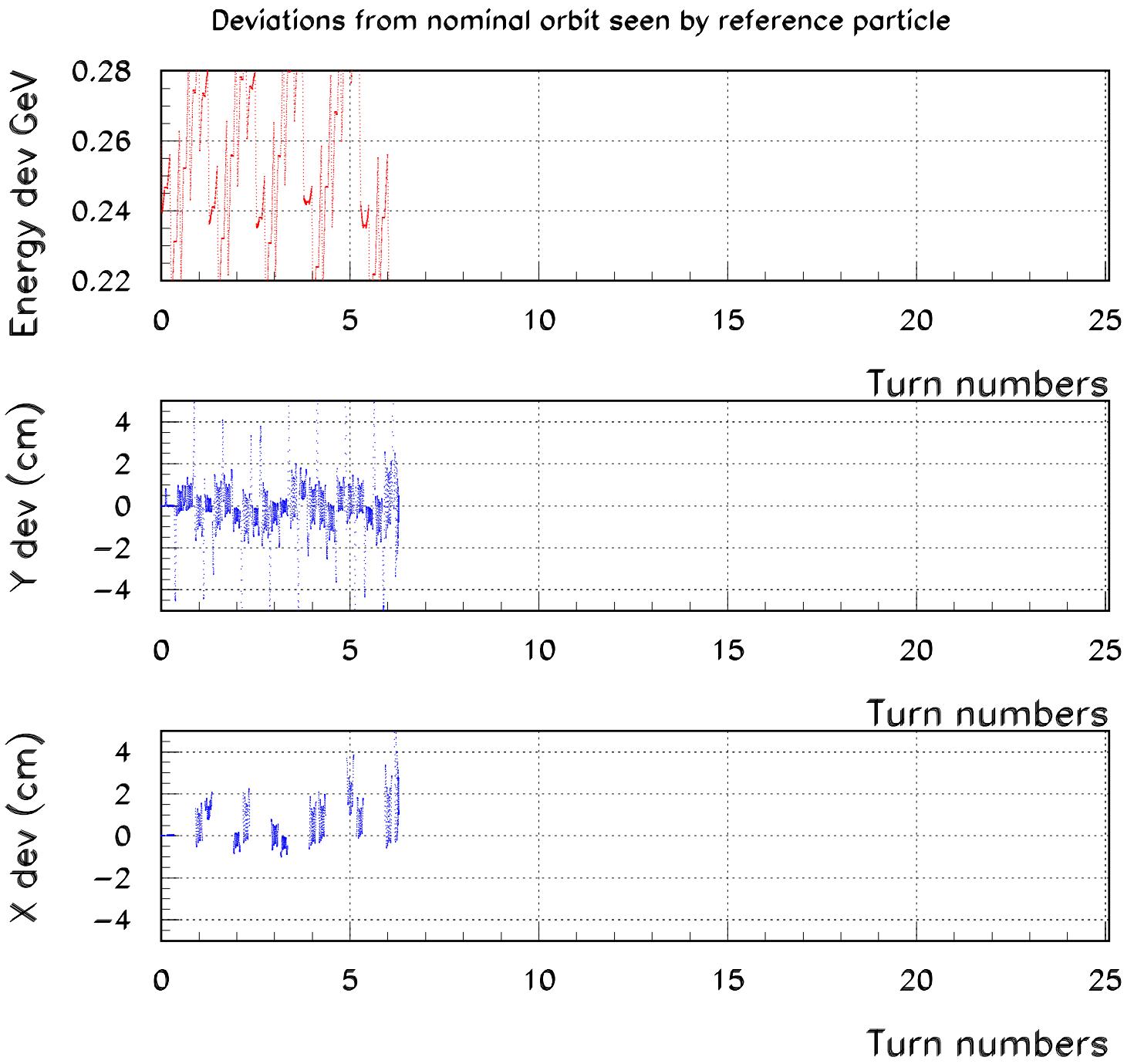


Figure 2: Synchron. oscill. when $Z \pm= 1\sigma$ and $E \pm= 1\sigma$.

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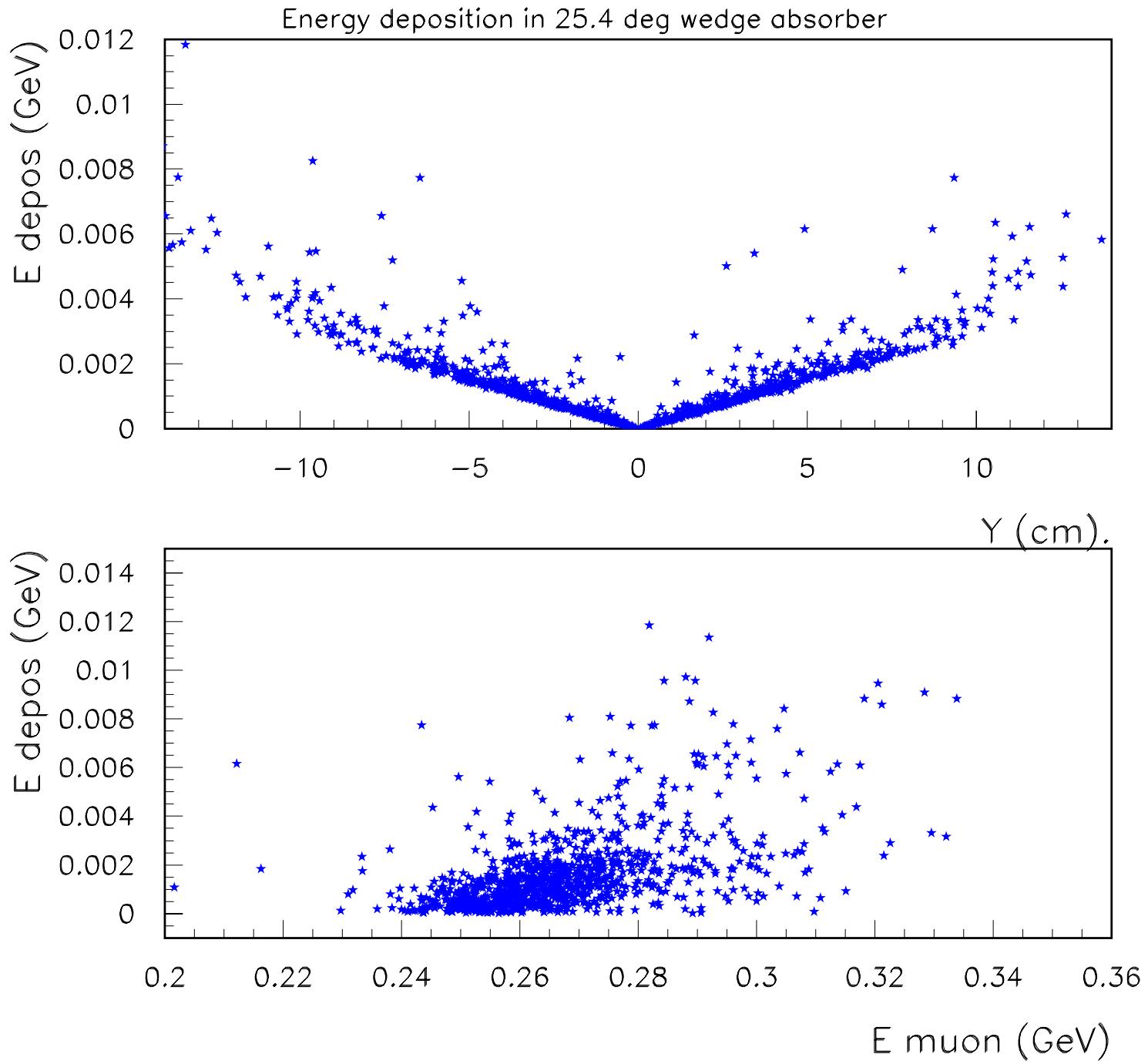


Figure 3: Energy deposition at LiH wedge absorber.

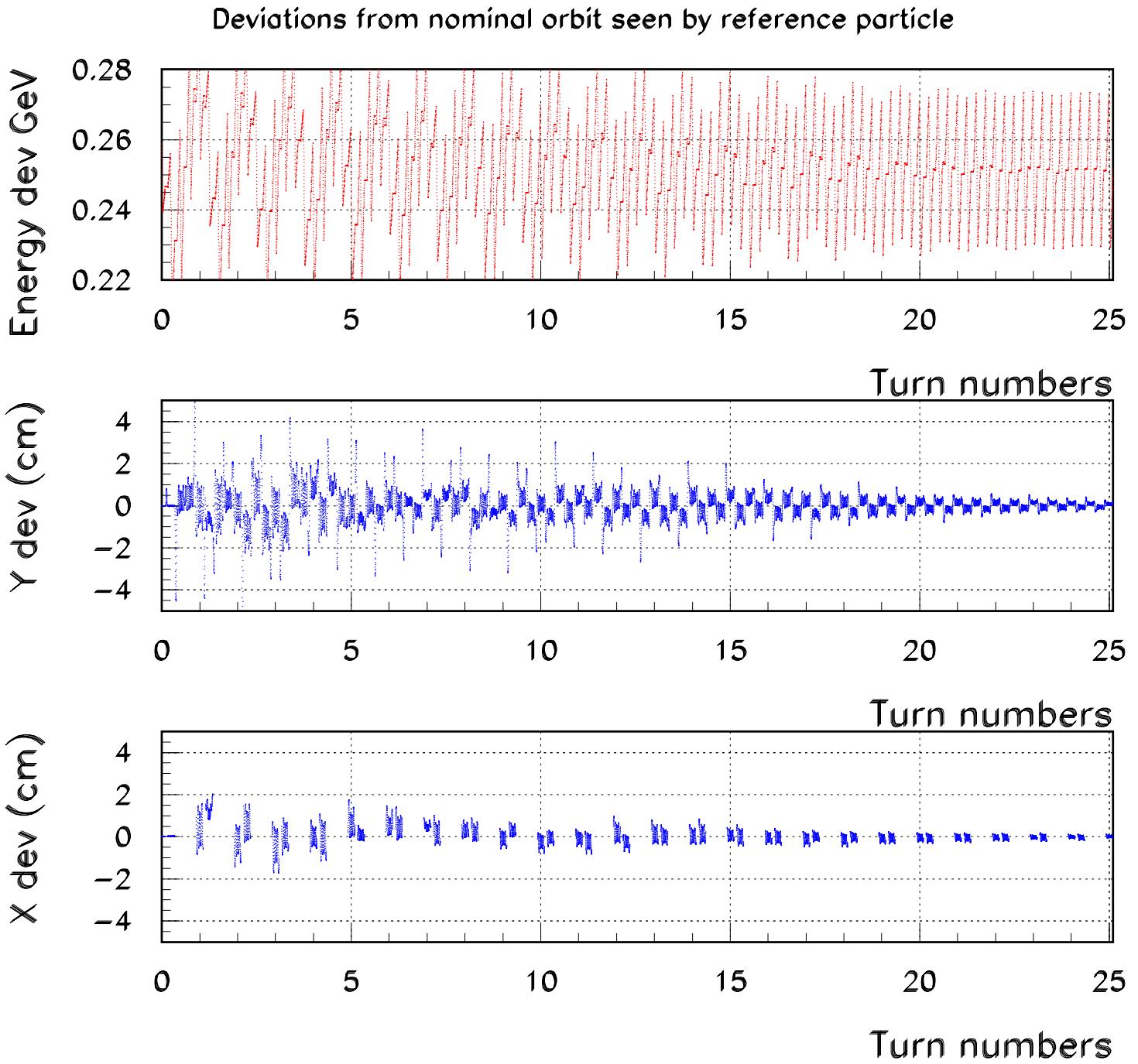


Figure 4: Cooling for particle when $E \pm = 1\sigma$ and $Z \pm = 1\sigma$.

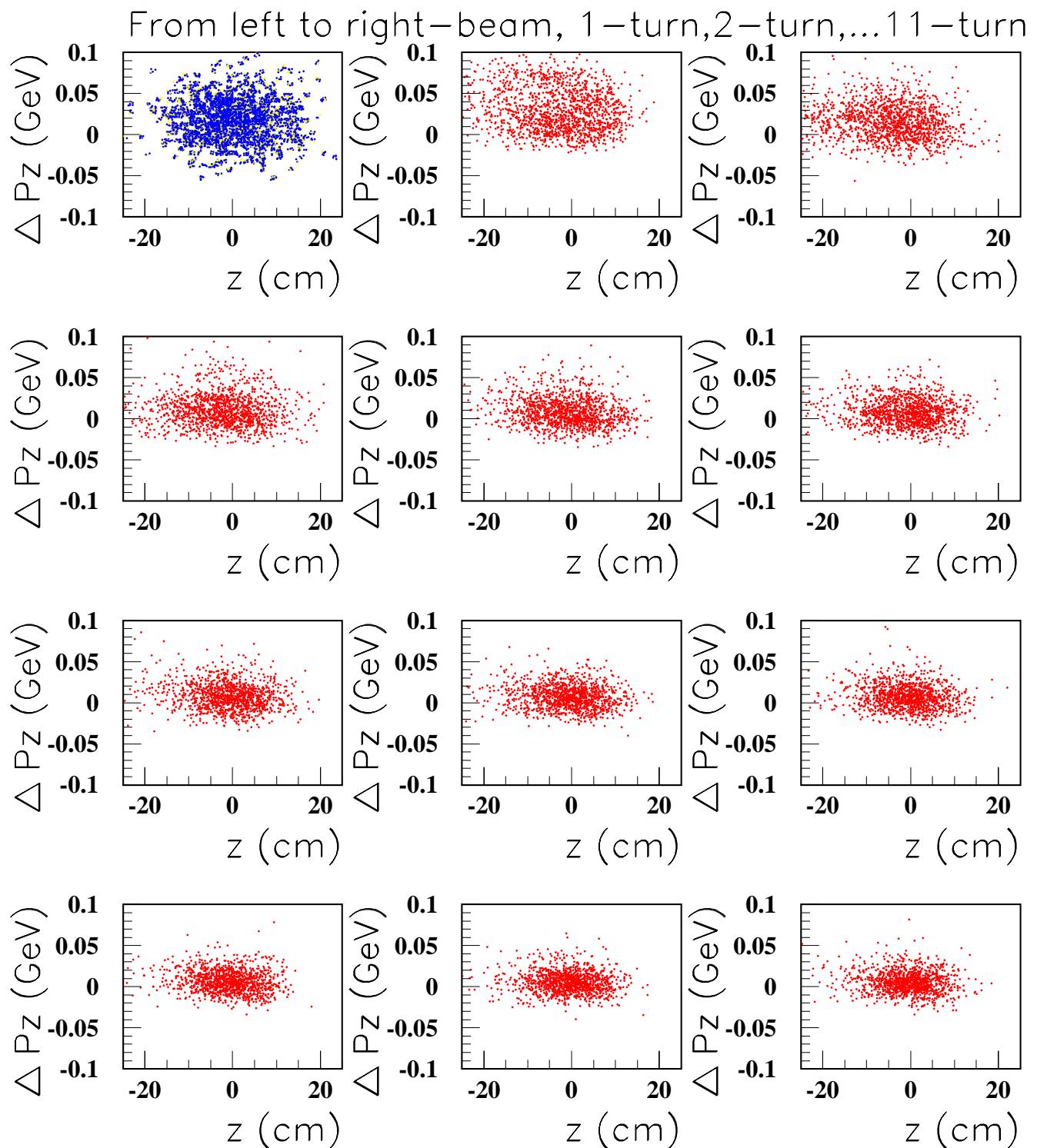


Figure 5: $Z - P_Z$ distribution turn by turn.

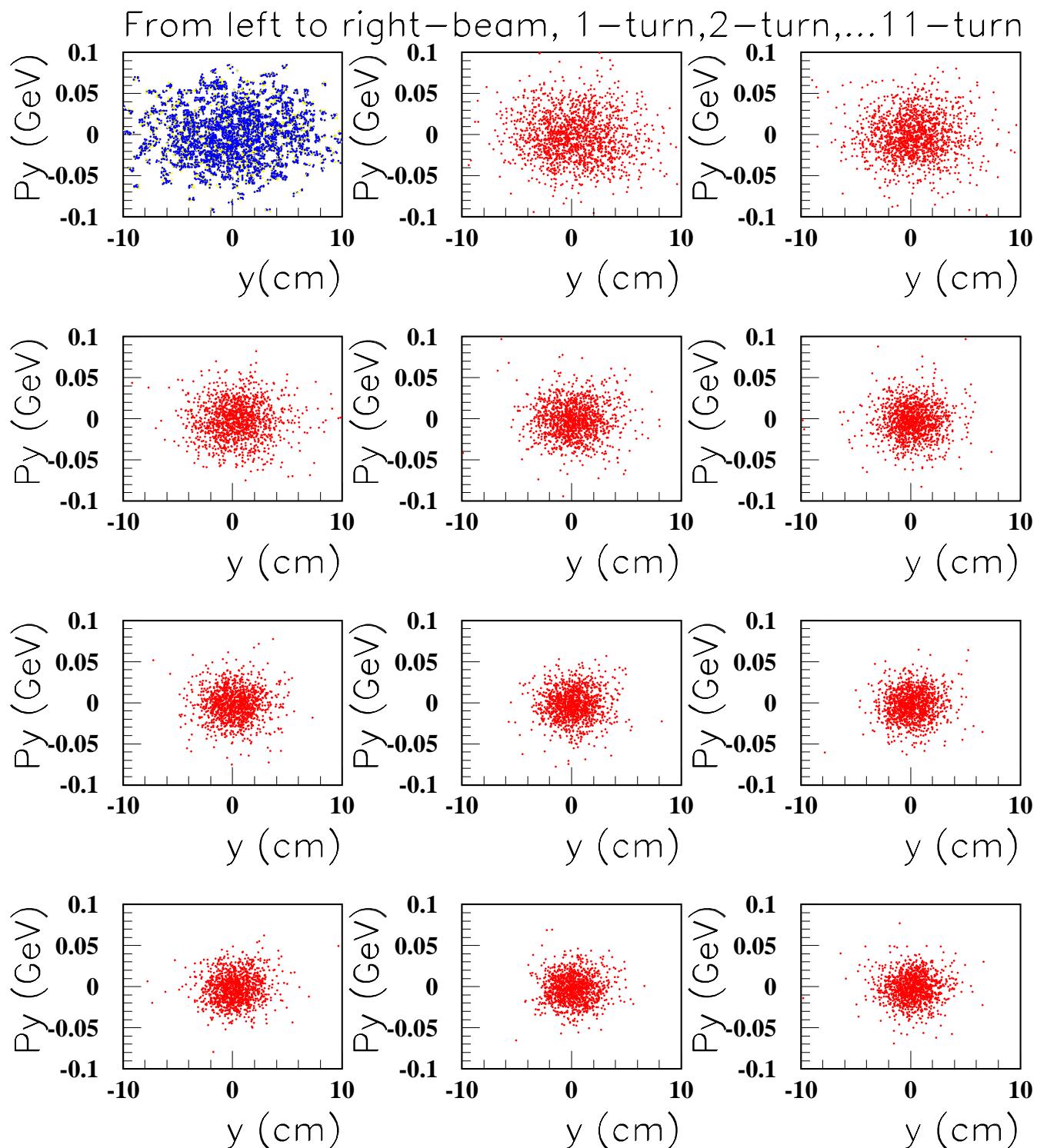


Figure 6: $Y - P_Y$ distribution turn by turn.

Tetra Solenoid Focused Ring

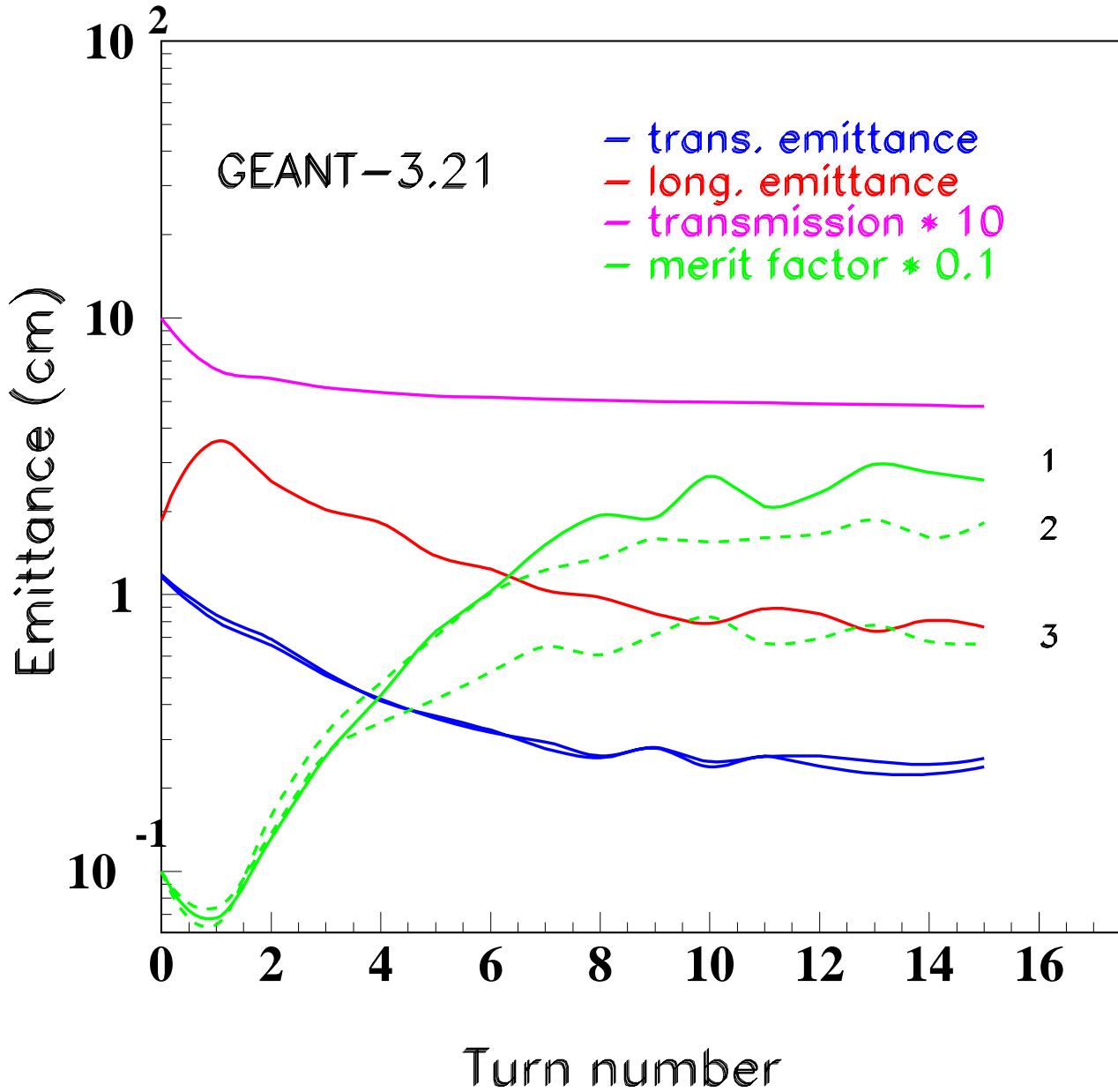


Figure 7: Emittances, transmission and merit factor. 1-no decay, 2-with decay, 3-with decay and 360 micron flat aluminium absorber window.

Conclusions

GEANT-3.21 simulation of the Tetra Solenoid Focused Ring agrees qualitatively with the results obtained by Balbekov and Fernow . . . but after 15 turns

	<i>GEANT</i>	<i>Balbekov-sim.</i>	<i>Fernow-ICOOL</i>
<i>Tr. w/o dec.</i>	.47	.71	-
<i>Tr. w. dec.</i>	.324	.48	.485
$Z_{emi}^{st}/Z_{emi}^{fin}$	2.30	2.38	4.48
$Y_{emi}^{st}/Y_{emi}^{fin}$	4.75	5.71	7.01
<i>Merit fac.</i>	16	38	103

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Double check : the same relation for cooling parameters for RFOFO ring simulation with ICOOL, GEANT , . . . problems

*it is necessary to understand perturbation in short solenoid part*¹⁰